TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No. SHIG 19990241

In Re Application Of: YAMAMOTO

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
09/890,143	July 26, 2001	KAO, Chih Cheng G.	27667	2882	7584

Invention:

OPTICAL ELEMENT SUCH AS MULTILAYER FILM REFLECTOR, AND THE LIKE, METHOD OF MANUFACTURING THE SAME, AND APPARATUS USING THE SAME

COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on **June 2, 2005**

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Signature

Dated: **June 14, 2005**

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cc:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Appln. Of:	YAMAMOTO
Serial No.:	09/890,143
Filed:	July 26, 2001
For:	OPTICAL ELEMENT SUCH AS MULTILAYER FILM...
Group:	2882
Examiner:	KAO, CHIH CHENG G. DOCKET: SHIG 19990241

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APPELLANT'S BRIEF ON APPEAL

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APPELLANT'S BRIEF ON APPEAL

This Brief is being filed in support of Appellant's Appeal from the Office Action Rejection by the Examiner to the Board of Appeals and Interferences. The Notice of Appeal, along with the prescribed fee, was filed on June 2, 2005.

REAL PARTY IN INTEREST

The Real Party in Interest in this Appeal is Tohoku Techno Arch Co., Ltd., a Japanese corporation having its principal place of business at 468, Aoba, Aramaki, Aoba-ku, Sendai-shi, Miyagi 980-0845, Japan. The Application has been assigned to Tohoku Techno Arch Co., Ltd. by the inventor Masaki Yamamoto, and the Assignment recorded in the U.S. Patent and Trademark Office on July 26, 2001, at Reel 012137, Frame 0090.

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RELATED APPEALS AND INTERFERENCES

To the best of the knowledge of the undersigned attorney and Appellant, there are no other appeals or interferences that would directly affect, or be directly affected by, or have a bearing on, the Board's decision in the present Appeal.

STATUS OF THE AMENDMENTS

The last amendment entered in this application is Amendment G under Rule 116 which was filed in response to a Final Action.

STATUS OF THE CLAIMS ON APPEAL

Claims 1-7 and 12-27 have been cancelled. Claim 11 has been allowed. The claims on appeal are claims 8-10 and 28-30, and are set forth in **Appendix A**, attached hereto.

BACKGROUND OF THE INVENTION

The present invention relates to optical elements such as reflectors that make use of reflection by a multilayer film. Multilayer films can be used to reflect x-rays that, when irradiated toward a body, are collected to produce an enlarged image of the body. The resolution and magnification capability is achieved in part, due to the wavelength of x-rays being one several hundredth or less than the wavelength of visual or ultraviolet rays.

SUMMARY OF THE INVENTION ON APPEAL

The present invention provides a method for forming an optical element having a multilayer film reflector capable of simple wavefront phase correction. (Specification, page 7, lines 9-11). The adjustment of the wavefront phase of emerging rays is accomplished by cutting away layers of the multilayer film. (Specification, page 7, lines 12-16; page 11, lines 8-15. See also Figs. 6, 7, 8(a)-8(c), 9(a) and 9(b)). In practice, the multilayer film is composed of

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alternating layers of a material having a high refractive index, and a material having a low refractive index. (Specification, page 9, lines 21-23)

The amount of film to be removed can be controlled by detecting a difference between the materials that form the multilayer film (Fig. 9(b)). A change of material caused by milling may be monitored using an electronic method or an optical method. The electronic method may be accomplished by measuring a change in a secondary electron discharge yield. The optical method may be accomplished by measuring an optical change or using ellipsometry. These methods may also be combined. (Specification, page 13, lines 2-12 and Fig. 2).

ISSUES PRESENTED ON APPEAL

The sole issue presented on Appeal is whether claims 8-10 and 28-30 are unpatentable under the judicially created doctrine of nonstatutory double patenting over claim 53 of copending Application Serial No. 10/241,959 (the '959 application)[1] in view of Sweeney et al., U.S. Patent No. 6,235,434 (hereinafter Sweeney et al.).

THE FINAL ACTION

Claims 8 and 10 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al.

Claim 9 has been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al. and further in view of Murakami, U.S. patent 6,160,867 (hereinafter Murakami).

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[1] As of this writing the '959 application remains pending, however, the '959 application has been allowed, and the issue fee paid (See printout from PAIR, **Appendix B**).

Claims 29 and 30 have been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al. and further in view of Iketaki, U.S. patent 5,163,078 (hereinafter Iketaki).

Claim 28 has been provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al. and further in view of Iketaki and Smith, U.S. patent 4,590,376 (hereinafter Smith).

The Examiner's position is perhaps best summarized in the Advisory Action issued in response to Appellant's Request for Reconsideration in which the Examiner states:

> "...Applicant argues that since the instant application pre-dates Application #10/241,959, the Examiner should withdraw the provisional double patenting rejection against the instant Application and permit the instant Application to issue as a patent (MPEP 804(1)(B)). The Examiner disagrees. Referring to MPEP 804(1)(B), it states that "(if) the 'provisional' double patenting rejections in both applications are the only rejections remaining in those applications, the examiner should then withdraw that rejection in one of the applications (e.g., the application with the earlier filing date) and permit the application to issue as a patent." Although it appears that the Examiner should withdraw the provisional double patenting rejection in the instant Application, due to its earlier filing date, the MPEP only states this as an example. The MPEP does not state that the Examiner must withdraw the provisional double patenting rejection in the application with the earlier filing date. Since Application #10/241,959 is already being permitted to issue as a patent, the Examiner is accordingly maintaining the double patenting rejection in the instant Application as a provisional double patenting rejection, based on the section in MPEP 804(1)(B) which states that "(the) examiner should maintain the double patenting rejection in the other application as a 'provisional' double patenting rejection which will be converted into a double patenting rejection when the one application issues as a patent." Therefore, Applicant's arguments are not persuasive, and the claims remain rejected."

GROUPING OF CLAIMS

Each of the several rejected claims 8, 9, 10, 27, 28, 29 and 30 are separately patentable.

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THE REFERENCES

Oshino et al., U.S. Application. No. 10/241,959

Claim 53, the only claim in issue of the '959 application[2] reads as follows:

> "A multilayer-film mirror, comprising:
> a mirror substrate; and
> a multilayer film formed on a surface of the mirror substrate by alternatingly laminating multiple layers of at least two types of substances having different respective refractive indices, the layers being grouped into lamina sets having a specified period length, the multilayer film including a removed portion at a selected location at which at least one lamina set is removed to control phase shift in a reflected wavefront from the multilayer film, the removed portion having a predetermined depthwise gradation with respect to amount of layer material removed."

Sweeney et al., U.S. Patent No. 6,235,434

Sweeney teaches a method for repair of amplitude and/or phase defects in lithographic masks of the kind often used in semiconductor fabrication. (Abstract, Column 1, lines 19-22) The method requires determining the equivalent size of a mask defect followed by optically compensating for the mask defect by removing a portion of the absorber material proximate to the mask defect. (Column 2, lines 47-55).

Murakami, U.S. Patent No. 6,160,867

Murakami teaches improved x-ray-reflecting mirrors that have reduced internal stress without compromising x-ray reflectance. (Abstract) The mirrors consist of a multilayer structure on a substrate. The layers are composed of alternating materials that can have internal stress controlled by controlling the amount of diffused dopant in the materials. Id. The first material consists essentially of a substance selected from the group consisting of Mo, Rh, Ru, Re, W, Ta, Ni, Cr, Al, and alloys of such substances. The second material consists essentially

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[2] As noted supra, the '959 application has been allowed. Claim 53 as allowed is set forth in Oshino et al.'s November 16, 2004 Amendment (**Appendix C**).

of silicon (as a principal constituent) and a dopant, selected from the group consisting of B, C, and P, diffused into the silicon. The dopant is at a concentration that is sufficient to reduce the net internal stress in the multi-layer structure. (Column 2, lines 52-62)

Iketaki, U.S. Patent No. 5,163,078

Iketaki teaches a multilayer film reflecting mirror suitable to be used as an optical element in an x-ray optical system. (Abstract) The thickness of coatings applied by methods such as electronic beam evaporation and sputtering can be monitored within 0.1Å using a crystal oscillator and ellipsometer. (Column 5, lines 25-31)

Smith, U.S. Patent No. 4,590,376

Smith teaches an instrument for monitoring the surface characteristics of materials by measurement of a current of photo-emitted electrons flowing from the surface to a collector. (Abstract) The instrument transmits ultraviolet (UV) radiation against the surface to be measured and detects the emitted photoelectrons, which can be correlated to oxide thickness, contamination, or fatigue. (Abstract) The instrument includes a source of UV radiation, an electrical biasing means for creating an electrical potential between the instrument and the surface being studied in order to cause photoemitted electrons to flow from the surface to the instrument. In addition, instrument includes a charge collector, an amplifier or electrometer to produce a signal proportional to the current of the photoemitted electrons, and electronic circuitry analyze the resulting current. (Column 2, lines 35-52)

ARGUMENT ON APPEAL

I. The Rejection of Claims 8-10 and 28-30 as Unpatentable Under the Judicially Created Doctrine of Nonstatutory Double Patenting is Procedurally in Error.

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The pertinent sections of the MPEP discussing the guidelines for double patenting rejections are set forth below.

> **§ 804(I)**
> A double patenting rejection may arise between two or more pending applications, between one or more pending applications and a patent, or between one or more pending applications and a published application.
>
> **§ 804(I)(A) Between Issued Patents and One or More Applications**
> Double patenting may exist between an issued patent and an application filed by . . . an inventive entity having a common inventor with the patent.
>
> **§ 804(I)(B) Between Copending Applications—Provisional Rejections**
> Occasionally, the examiner becomes aware of two copending applications filed by . . . different inventive entities having a common inventor, and/or by a common assignee that would raise an issue of double patenting if one of the applications became a patent. Where this issue can be addressed without violating the confidential status of applications (35 U.S.C. 122), the courts have sanctioned the practice of making applicant aware of the potential double patenting problem if one of the applications became a patent by permitting the examiner to make a "provisional" rejection on the ground of double patenting. The merits of such a provision rejection can be addressed by both the applicant and the examiner without waiting for the first patent to issue.
>
> The "provisional" double patenting rejection should continue to be made by the examiner in each application as long as there are conflicting claims in more than one application unless that "provisional" double patenting rejection is the only rejection remaining in one of the applications. If the "provisional" double patenting rejection in one application is the only rejection remaining in that application, the examiner should then withdraw that rejection and permit the application to issue as a patent thereby converting the "provisional" double patenting rejection in the other application(s) into a double patenting rejection at the time the one application issues as a patent.
>
> If the "provisional" double patenting rejections in both applications are the only rejections remaining in those applications, the examiner should then withdraw that rejection in one of the applications (e.g., the application with the earlier filing date) and permit the application to issue as a patent. The examiner should maintain the double patenting rejection in the other application as a "provisional" double patenting rejection which will be converted into a double patenting rejection when the one application issues as a patent. (Underlining added for emphasis).

The linchpin of the Examiner's nonstatutory double patenting rejection is Oshino et al., U.S. Application. No. 10/241,959 (the '959 application). The '959 application has a U.S. filing

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date of September 11, 2002 and a foreign priority date of September 26, 2001 and is the joint invention of Masaki Yamamoto, the Appellant hereof, and Tetsuya Oshino, Katsuhiko Murakami, Hiroyuki Kondo and Katsumi Sugisaki. The application is assigned to Nikon Corp. As noted supra, the '959 application stands allowed and the issue fee has been paid.

The application on Appeal has a U.S. filing date of July 26, 2001 and a foreign priority date of November 29, 1999. The sole inventor is Masaki Yamamoto. The application on Appeal is assigned to Tohoku Techno Arch Co., Ltd. This application stands finally rejected.

The '959 application cited by the Examiner involves a different inventive entity than the application on Appeal, but as noted supra has one common inventor (Masaki Yamamoto). The '959 application was filed in the U.S. more than one year after and has a foreign priority date nearly two years later than the application on Appeal. The '959 application is assigned to a different assignee than the application on Appeal. Thus, since the '959 application and the application on Appeal are not commonly owned a terminal disclaimer cannot be filed in this case even if the non-statutory double patenting rejection were otherwise proper, which it is not.

A. Examiner Did Not Specify Whether Both Pending Applications Were Subject to Provisional Double Patenting Rejections.

The threshold requirement imposed by MPEP § 804(I)(B) is that in the appropriate case (i.e., when the examiner becomes aware of two copending applications by different inventive entities having a common inventor that would raise an issue of double patenting if one of the applications became a patent), "[t]he 'provisional' double patenting rejection should continue to be made by the examiner in each application." (Emphasis added) Consultation of the file wrapper of the '959 application (see **Appendix D** which comprises the one substantive Office Action issued in the '959 application) reveals that no such rejection was made. Accordingly,

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the PTO erred in raising a provisional double patenting rejection to only the application on Appeal.

B. Examiner Did Not Specify Whether Provisional Double Patenting Rejections Were the Only Remaining Objections for Both Applications.

Section 804(I)(B) provides an exception to the imposition of the double patenting rejection when an application's only remaining rejection is a "provisional" double patenting rejection. Such is the case in the application on Appeal. Therefore, according to § 804(I)(B), "the examiner should then withdraw that rejection and permit the application to issue as a patent." In theory, if no provisional double patenting rejection exists in the '959 patent, the provisional rejection should be withdrawn from the current application, and the application permitted to issue as a patent.

As the Examiner points out in the Advisory Action, § 804(I)(B) provides, in certain circumstances, for a provisional double patenting rejection to be upheld "[i]f the 'provisional' double patenting rejections in both applications are the only rejections remaining in those applications" (underlining added for emphasis). In that case, "the examiner should then withdraw that rejection in one of the applications . . . and permit the application to issue as a patent. The examiner should maintain the double patenting rejection in the other application . . ." Assuming *arguendo* that the only outstanding rejection of the '959 application was also an nonstatutory double patenting rejection,[3] the Examiner has taken the position that the double patenting rejection should withdrawn from the '959 application and maintained in the application on Appeal as a provisional rejection until the '959 patent finally issues, and upon

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[3] *See* Section A, *supra*, discussing the lack of provisional double patenting rejections in both applications involved in this case.

issuance of the '959 application, the provisional rejection of the application on Appeal will be converted into a non-provisional rejection.[4]

C. Examiner Did Not Specify What Criteria (If Not Filing Date) Were Used to Determine Selection of Issuing Patent.

Although the factual and procedural posture of the application on Appeal are somewhat unusual, a central issue on appeal involves the argument raised by the Examiner in the Advisory Action. In the case of two applications, both having their only respective rejections being provisional nonstatutory double patenting rejections[5] what criteria are to be used to decide which application to withdraw and which application to maintain the double patenting rejection? According to the Examiner, § 804(I)(B) merely provides one example of withdrawing the provisional rejection in the application having the earlier filing date. Indeed, there is no other more appropriate criteria to use in making such a determination. However, in the instant case and without reason, explanation, or justification the Examiner raised a provisional double patenting rejection only in the application on Appeal (which has the earlier filing date) while allowing the '959 application with the later filing date to proceed to allowance. This is the incorrect result. According to Chisum:

> The double patenting doctrine precludes one person from obtaining more than one valid patent for the same invention or obvious modifications of the same invention. Double patenting is concerned with attempts to claim related subject matter twice. It does not preclude a second patent on subject matter that is disclosed but not claimed in the first patent.
>
> The primary purpose of the double patenting doctrine is to prevent an extension of the statutory period of monopoly that would occur if successive patents were allowed on the same basic concept.
> * * *

[4] MPEP § 804(I)(B).
[5] No provisional nonstatutory double patenting rejection was ever raised in the '959 application (**Appendix D**).

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> The courts developed the double patenting doctrine in an era during which all United States patents had a term of years beginning at the date the patent issued. A patent's expiration was a function of its issue date, and a second patent would extend the monopoly period if it was issued later in time. Under the 1994 Uruguay Round Agreements Act, the term of some patents will be set so that they expire a number of years after their earliest referenced application filing date. This change will alter the scenarios raising double patenting concerns, but it does not alter the fundamental policies against issuing multiple patents for the same claimed invention or for obvious variations of the same invention.[6]

The application on Appeal claims a method for forming an optical element by stacking alternating layers of high refractive index material and low index material on a substrate followed by cutting away portions of the multilayer film in order to adjust the wavefront phase. (**Appendix A**). Claim 53 of the '959 application is a product claim directed toward a multilayer film mirror comprising a substrate and a multilayer film formed on the surface of the mirror substrate by alternatingly laminating multiple layers of at least two types of substances having different respective refractive indices, the layers being grouped into lamina sets having a specified period length, the multilayer film including removed portions at a selected location at which at least one lamina set is removed to control phase shift in a reflected wavefront from the multilayer film, the removed portion having a predetermined depthwise gradation with respect to the amount of layer material removed. (**Appendix C**).

Had the earlier filed application on Appeal issued first, would the later filed '959 patent be rejected for double patenting? In fact, rejection of the application on Appeal is a particularly unsupportable use of the double patenting rejection because under no circumstances could a patent on the instant invention provide an extension of the monopoly because any patent on the application on Appeal would expire before a patent issuing from the '959 application since the '143 application was filed before the '959 application!

[6] 3 DONALD S. CHISUM, CHISUM ON PATENTS § 9.01 (2003) (internal citations removed).

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As courts and commentators have observed:

> An inventor may first file an application for a patent claiming a basic or generic invention and thereafter file a patent on an improvement on that basic invention. The broader basic patent may face greater difficulty in the Patent Office examination process with the result that a patent on the improvement issues first. The question then arises whether a second patent on the broader generic invention is barred by double patenting. Under general principles of patentability, an earlier patent anticipates a later generic one. . . . On the other hand, to deny a patent may be unfair to the applicant who does not have complete control over the rate of progress of an application through the Patent Office.[7]

Here, the imposition of the double patenting rejection on the earlier filed application on Appeal is particularly inequitable because the first filed application was the invention of the sole inventor of the subject matter. The double patenting rejection, as currently applied, essentially transfers his rights as sole inventor of the underlying technology to the group of inventors (of which he is just one member) that developed the further improvements on the technology.

Thus, the rejection of claims 8-10 and 28-30 as unpatentable under the judicially created doctrine of nonstatutory double patenting is procedurally in error.

II. The Rejection of Claim 8 for obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al. is in error.

[7] 3 DONALD S. CHISUM, CHISUM ON PATENTS § 9.03[2][c] (internal citations removed). *See also Thomson-Houston Electric Co. v. Ohio Brass* 80 F. 712, 724 (6th Cir. 1897) wherein Judge Taft addressed this issue:

> Since the case of O'Reilly v. Morse . . . it has been well settled that a patent may issue for an improvement on an earlier invention either to the original inventor or to a stranger. Of course, no one can use the improvement without right or license to use the fundamental invention; but, on the other hand, the right to use the original invention does not confer the right to use the improvement without license from the tributary inventor. We do not understand this general doctrine to be denied, but it is said that if, by some chance, the application for the fundamental patent is delayed in its course through the patent office until a patent on the avowed improvement has issued, then the patent on the improvement on the fundamental invention is void. In cases where the delay in the issuing of the patent for the main invention cannot be charged to the laches [sic] or fraud of the patentee, such a rule would be a hard one; and unless it is required by the express words of the statute, or by the express holding of the supreme court [sic], we should be inclined, if possible, to avoid declaring it to exist.

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As this honorable Board is well aware, double patenting is all about what is being claimed. Claim 53 of the '959 application is a product claim. Claim 8 on appeal is a method claim. Thus, on that basis alone, the claims are distinct. Indeed, in the prosecution of the '959 application, the Examiner twice raised restriction requirements between the then pending method claims and product claims, taking the position that the method claimed inventions and the product claimed inventions were both distinct and unrelated. (See the Office Action of December 5, 2003 (**Appendix E**) and the Office Action of May 17, 2004 (**Appendix F**)[8]).

In the '959 application, the Examiner took the position that the method claims were distinct and unrelated inventions. Here, the Examiner takes the position that method claim 8 of the application on Appeal is the same invention as product claim 53 of the '959 application. Curiously, the Examiner who signed off on the restriction requirement in the '959 application, is the same Examiner who signed off on the Advisory Action in the application on Appeal! Having taken the position that the method claims and product claims are distinct and that the inventions unrelated in the '959 application, it is error to now take the position that the method claims in the application on Appeal are not patentably distinct from the product claims of the '959 application. Adding Sweeney et al. does not change this. Thus, the rejection of claim 8 under the judicially created doctrine of obviousness-type double patenting over claim 53 of copending application '959 in view of Sweeney et al. is in error.

III. The Rejection of Claim 9 for obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al. and Murakami is in error.

Similar comments apply to the rejection of claim 9. Claim 53 of the '959 application is a product claim. Claim 9 on appeal is a method claim. Thus, on that basis alone, the claims are

[8] The restriction requirement was made final in the July 14, 2004 Action (**Appendix D**)

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distinct. Moreover, as noted supra, in the prosecution of the '959 application, the Examiner twice raised restriction requirements between the then pending method claims and product claims, taking the position that the method claimed inventions and the product claimed inventions were both distinct and unrelated. (See the Office Action of December 5, 2003 (**Appendix E**) and the Office Action of May 17, 2004 (**Appendix F**)[9]).

In the '959 application, the Examiner took the position that the method claims were distinct and unrelated inventions. Here, the Examiner takes the position that method claim 9 of the application on Appeal is the same invention as product claim 53 of the '959 application. Curiously, the Examiner who signed off on the restriction requirement in the '959 application, is the same Examiner who signed off on the Advisory Action in the application on Appeal! Having taken the position that the method claims and product claims are distinct and that the inventions unrelated in the '959 application, it is error to now take the position that the method claims in the application on Appeal are not patentably distinct from the product claims of the '959 application. Adding Sweeney et al. and Murakami does not change this. Thus, the rejection of claim 9 under the judicially created doctrine of obviousness-type double patenting over claim 53 of copending application '959 in view of Sweeney et al. and Murakami is in error.

IV. The Rejection of Claim 10 for obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al. is in error.

Similar comments also apply to the rejection of claim 10. Claim 53 of the '959 application is a product claim. Claim 10 on appeal is a method claim. Thus, on that basis alone, the claims are distinct. As noted supra, in the prosecution of the '959 application, the Examiner twice raised restriction requirements between the then pending method claims and

[9] The restriction requirement was made final in the July 14, 2004 Action (**Appendix D**)

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product claims, taking the position that the method claimed inventions and the product claimed inventions were both distinct and unrelated. (See the Office Action of December 5, 2003 (**Appendix E**) and the Office Action of May 17, 2004 (**Appendix F**)[10]).

In the '959 application, the Examiner took the position that the method claims were distinct and unrelated inventions. Here, the Examiner takes the position that method claim 10 of the application on Appeal is the same invention as product claim 53 of the '959 application. Curiously, the Examiner who signed off on the restriction requirement in the '959 application, is the same Examiner who signed off on the Advisory Action in the application on Appeal! Having taken the position that the method claims and product claims are distinct and that the inventions unrelated in the '959 application, it is error to now take the position that the method claims in the application on Appeal are not patentably distinct from the product claims of the '959 application. Adding Sweeney et al. does not change this. Thus, the rejection of claim 10 under the judicially created doctrine of obviousness-type double patenting over claim 53 of copending application '959 in view of Sweeney et al. is in error.

V. The Rejection of Claim 28 for obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al. in view of Iketaki and Smith is in error.

Like comments apply to the rejection of claim 28. Claim 53 of the '959 application is a product claim. Claim 28 on appeal is a method claim. Thus, on that basis alone, the claims are distinct. In the prosecution of the '959 application, the Examiner twice raised restriction requirements between the method claims and product claims, taking the position that the method claimed inventions and the product claimed inventions were both distinct and

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[10] The restriction requirement was made final in the July 14, 2004 Action (**Appendix D**)

unrelated. (See the Office Action of December 5, 2003 (**Appendix E**) and the Office Action of May 17, 2004 (**Appendix F**)[11]).

In the '959 application, the Examiner took the position that the method claims were distinct and unrelated inventions. Here, the Examiner takes the position that method claim 28 of the application on Appeal is the same invention as product claim 53 of the '959 application. Curiously, the Examiner who signed off on the restriction requirement in the '959 application, is the same Examiner who signed off on the Advisory Action in the application on Appeal! Having taken the position that the method claims and product claims are distinct and that the inventions unrelated in the '959 application, it is error to now take the position that the method claims in the application on Appeal are not patentably distinct from the product claims of the '959 application. Adding Sweeney et al., Iketaki and Smith does not change this. Thus, the rejection of claim 28 under the judicially created doctrine of obviousness-type double patenting over claim 53 of copending application '959 in view of Sweeney et al., Iketaki and Smith is in error.

VI. The Rejection of Claim 29 for obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al. and Iketaki is in error.

Like comments also apply to the rejection of claim 29. As noted supra, claim 53 of the '959 application is a product claim. Claim 29 on appeal is a method claim. Thus, on that basis alone, the claims are distinct. As noted supra, in the prosecution of the '959 application, the Examiner twice raised restriction requirements between the then pending method claims and product claims, taking the position that the method claimed inventions and the product claimed

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[11] The restriction requirement was made final in the July 14, 2004 Action (**Appendix D**)

inventions were both distinct and unrelated. (See the Office Action of December 5, 2003 (**Appendix E**) and the Office Action of May 17, 2004 (**Appendix F**)[12]).

In the '959 application, the Examiner took the position that the method claims were distinct and unrelated inventions. Here, the Examiner takes the position that method claim 29 of the application on Appeal is the same invention as product claim 53 of the '959 application. Curiously, the Examiner who signed off on the restriction requirement in the '959 application, is the same Examiner who signed off on the Advisory Action in the application on Appeal! Having taken the position that the method claims and product claims are distinct and that the inventions unrelated in the '959 application, it is error to now take the position that the method claims in the application on Appeal are not patentably distinct from the product claims of the '959 application. Adding Sweeney et al. and Iketaki does not change this. Thus, the rejection of claim 29 under the judicially created doctrine of obviousness-type double patenting over claim 53 of copending application '959 in view of Sweeney et al. and Iketaki is in error.

VII. The Rejection of Claim 30 for obviousness-type double patenting as being unpatentable over claim 53 of the '959 application in view of Sweeney et al. and Iketaki is in error.

The rejection of claim 30 likewise is in error. Claim 53 of the '959 application is a product claim. Claim 30 on appeal is a method claim. Thus, on that basis alone, the claims are distinct. In the prosecution of the '959 application, the Examiner twice raised restriction requirements between the then pending method claims and product claims, taking the position that the method claimed inventions and the product claimed inventions were both distinct and unrelated. (See the Office Action of December 5, 2003 (**Appendix E**) and the Office Action of May 17, 2004 (**Appendix F**)[13]).

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[12] The restriction requirement was made final in the July 14, 2004 Action (**Appendix D**)
[13] The restriction requirement was made final in the July 14, 2004 Action (**Appendix D**)

In the '959 application, the Examiner took the position that the method claims were distinct and unrelated inventions. Here, the Examiner takes the position that method claim 30 of the application on Appeal is the same invention as product claim 53 of the '959 application. Curiously, the Examiner who signed off on the restriction requirement in the '959 application, is the same Examiner who signed off on the Advisory Action in the application on Appeal! Having taken the position that the method claims and product claims are distinct and that the inventions unrelated in the '959 application, it is error to now take the position that the method claims in the application on Appeal are not patentably distinct from the product claims of the '959 application. Adding Sweeney et al. and Iketaki does not change this. Thus, the rejection of claim 29 under the judicially created doctrine of obviousness-type double patenting over claim 53 of copending application '959 in view of Sweeney et al. and Iketaki is in error.

SUMMARY

In summary, it is respectfully submitted that the provisional double patenting rejection is in error. The prescribed procedure for issuing the provisional nonstatutory double patenting rejection for two pending applications was not followed. The Examiner's choice to maintain the provisional rejection in the instant application is in error in light of the subject matter claimed, the respective filing dates, and the status of the inventor.

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CONCLUSION

In view of the foregoing, it is respectfully requested that the rejection of the subject application be reversed in all respects.

Respectfully submitted,

Norman P. Soloway
Attorney for Appellant
Reg. No. 24,315

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By: Linda Vaubel

NPS/JEK:lv

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APPENDIX A

CLAIMS ON APPEAL

Claim 8: A method for forming an optical element comprising the steps of:

forming on a substrate a multilayer film consisting of a stack of alternating layers of high refractive index material and low refractive index material to control a phase and an amplitude of emerging rays; and

adjusting a wavefront phase of the emerging rays by cutting away a portion of the multilayer film stack in accordance with an amount of adjustment of the wavefront phase.

Claim 9: A method according to claim 8, wherein the multilayer film stack is formed in a number of cycles larger than that necessary to saturate a reflectance.

Claim 10: A method according to claim 8, wherein cutting-away of the multilayer film is controlled by detecting a difference in a material that forms the multilayer film stack.

Claim 28: A method according to claim 10, wherein a difference in material is detected by monitoring a secondary electron discharge.

Claim 29: A method according to claim 10, wherein a difference in material is detected by monitoring an optical change of characteristics.

Claim 30: A method according to claim 29, wherein said optical change of characteristics monitored is a change in an optical constant of visible rays or a change based on ellipsometry.

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10/241,959 **APPARATUS AND METHODS FOR SURFICIAL MILLING OF SELECTED REGIONS ON SURFACES MULTILAYER-FILM REFLECTIVE MIRRORS AS USED IN X-RAY OPTICAL SYSTEMS**

Application Data | Transaction History | Image File Wrapper | Patent Term Adjustments | Foreign Priority | Publication Dates | Address & Attorney/Agent

This application is officially maintained in electronic form. To View: Click the desired Document Description. To Download and Print: Check the desired document(s) and click StartDownload.

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05-05-2005	**Issue Fee Payment Recorded**	**1**	☐
05-05-2005	Miscellaneous Incoming Letter	1	☐
05-05-2005	**Drawings**	**7**	☐
02-03-2005	Notice of Allowance and Fees Due (PTOL-85)	3	☐
02-03-2005	**Notice of Allowance and Fees Due (PTOL-85)**	**3**	☐
02-03-2005	Issue Information including classification, examiner, name, claim, renumbering, etc.	1	☐
02-03-2005	**Bibliographic Data Sheet**	**1**	☐
02-03-2005	Search information including classification, databases and other search related notes	1	☐

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11-19-2004	**Amendment - After Non-Final Rejection**	**2**	☐
11-19-2004	Claims	8	☐
11-09-2004	**Fee Worksheet (PTO-875)**	**1**	☐
11-08-2004	Miscellaneous Action with SSP	2	☐
10-29-2004	**Amendment - After Non-Final Rejection**	**1**	☐
10-29-2004	Abstract	1	☐
10-29-2004	**Specification**	**1**	☐
10-29-2004	Claims	2	☐
10-29-2004	**Applicant Arguments or Remarks Made in an Amendment**	**2**	☐
10-29-2004	Extension of Time	2	☐
07-14-2004	**Non-Final Rejection**	**5**	☐
07-14-2004	List of References cited by applicant and considered by examiner	1	☐
07-14-2004	**List of references cited by examiner**	**1**	☐
07-14-2004	Index of Claims	1	☐
07-14-2004	**Search information including classification, databases and other search related notes**	**1**	☐
06-07-2004	Response to Election / Restriction Filed	3	☐
05-17-2004	**Requirement for Restriction/Election**	**7**	☐
05-17-2004	Search information including classification, databases and other search related notes	1	☐
01-09-2004	**Response to Election / Restriction Filed**	**4**	☐
12-05-2003	Requirement for Restriction/Election	5	☐
12-05-2003	**Search information including classification, databases and other search related notes**	**1**	☐
11-27-2002	Specification	56	☐

11-27-2002	**Claims**	**14**	☐
11-27-2002	Abstract	2	☐
11-27-2002	**Drawings**	**32**	☐
11-27-2002	Specification	70	☐
11-27-2002	**Claims**	**24**	☐
11-27-2002	Claims	2	☐
11-27-2002	**Drawings**	**22**	☐
11-27-2002	Oath or Declaration filed	4	☐
11-27-2002	**Specification**	**31**	☐
11-27-2002	Claims	5	☐
11-27-2002	**Abstract**	**1**	☐
11-27-2002	Drawings	10	☐
11-27-2002	**Information Disclosure Statement (IDS) Filed**	**2**	☐
11-27-2002	Applicant Response to Pre-Exam Formalities Notice	2	☐
10-02-2002	**Pre-Exam Formalities Notice**	**1**	☐
09-11-2002	Claims Worksheet (PTO-2022)	1	☐
09-11-2002	**Fee Worksheet (PTO-875)**	**1**	☐
09-11-2002	Fee Worksheet (PTO-875)	1	☐
09-11-2002	**Foreign Priority Papers Filed**	**43**	☐
09-11-2002	Transmittal letter	2	☐
09-11-2002	**Specification**	**30**	☐
09-11-2002	Claims	9	☐
09-11-2002	**Abstract**	**1**	☐

09-11-2002	Drawings	8	☐
09-11-2002	**Oath or Declaration filed**	**4**	☐

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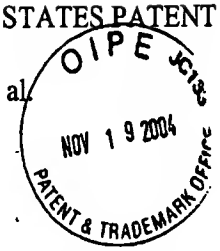

In re application of: Oshino et al.
Application No. 10/241,959
Filed: September 11, 2002
Confirmation No. 8759
For: APPARATUS AND METHODS FOR SURFICIAL MILLING OF SELECTED REGIONS ON SURFACES OF MULTILAYER FILM REFLECTIVE MIRRORS AS USED IN X-RAY OPTICAL SYSTEMS
Examiner: Jurie Yun
Art Unit: 2882
Attorney Reference No. 4641-63481-01

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Attorney for Applicant(s) Donald L. Stephens

Date Mailed November 16, 2004

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TRANSMITTAL LETTER

Enclosed for filing in the application referenced above are the following:

☒ Response to Notice of Non-Compliant Amendment

☒ The Director is hereby authorized to charge any additional fees that may be required, or credit over-payment, to Deposit Account No. 02-4550. A copy of this sheet is enclosed.

☒ Please return the enclosed postcard to confirm that the items listed above have been received.

Respectfully submitted,

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Donald L. Stephens Jr.
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cc: Client
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Attorney for Applicant(s) Donald L Stephens

Date Mailed November 16, 2004

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RESPONSE TO NOTICE OF NONCOMPLIANT AMENDMENT

This paper is submitted in reply to the Notice of Non-Compliant Amendment dated November 8, 2004. Since the alleged non-compliance pertains only to the claims, this paper only includes the "Amendments to the Claims" section from the original Amendment filed on October 26, 2004.

Respectfully submitted,

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Amendments to the Claims

1. (withdrawn) A device for milling a surface of a multilayer film on a multilayer-film reflective mirror, the multilayer film comprising multiple lamina sets formed at a specified period length on a mirror substrate, each lamina set consisting of alternating respective layers of at least two substances having different refractive indices to a wavelength of light to be reflected from the mirror, the device comprising a milling tool configured to remove one or more layers of the multilayer film at a selected location on the surface of the multilayer film so as to correct a phase shift in a wavefront of the light reflected from the multilayer-film mirror.

2. (withdrawn) The device of claim 1, further comprising a stage for holding the multilayer-film mirror relative to the milling tool.

3. (withdrawn) The device of claim 2, wherein the stage is configured to move the multilayer-film mirror in at least an X-Y or X-θ plane relative to the milling tool.

4. (withdrawn) The device of claim 1, wherein the milling tool is configured to remove one or more surficial lamina sets from the selected location in a manner yielding a desired depth profile of removed layers.

5. (withdrawn) The device of claim 1, wherein the milling tool is configured to remove one or more layers from the selected location in a manner yielding a desired lateral profile of removed layers.

6. (withdrawn) The device of claim 1, wherein the milling tool is a lapping tool.

7. (withdrawn) The device of claim 6, wherein the lapping tool comprises:

a lapping pad having a width smaller than a width dimension of the multilayer film;

a movement mechanism configured to move at least one of the multilayer-film mirror and the lapping tool relative to each other; and

a controller connected to the lapping tool and the movement mechanism, the controller being configured to control actuation of at least one of the lapping tool and the movement mechanism.

8. (withdrawn) The device of claim 6, comprising multiple lapping tools, one for application to each layer of a respective material.

9. (withdrawn) The device of claim 8, wherein each lapping tool is independently movable relative to the multilayer-film mirror.

10. (withdrawn) The device of claim 8, further comprising a controller connected to the multiple lapping tools and configured to select a particular lapping tool to contact the multilayer film at the selected location, based on the particular layer material to be milled at the location.

11. (withdrawn) The device of claim 6, further comprising a lapping-liquid dispenser situated relative to the lapping tool so as to dispense lapping liquid at the selected location whenever the lapping tool is removing material from the selected location.

12. (withdrawn) The device of claim 1, wherein the milling tool is an ion-beam milling tool.

13. (withdrawn) The device of claim 12, wherein the ion-beam milling tool comprises:

an ion source situated and configured to irradiate the selected location with a beam of ions;

a movement mechanism configured to move at least one of the multilayer-film mirror and the ion source relative to each other; and

a controller connected to the ion source and the movement mechanism, the controller being configured to control actuation of at least one of the ion source and the movement mechanism.

14. (withdrawn) The device of claim 13, further comprising a mask member situated between the ion source and the surface of the multilayer film, the mask member defining an opening serving to limit lateral spread of the ion beam as incident on the selected location on the surface of the multilayer film.

15. (withdrawn) The device of claim 12, further comprising a beam-adjustment mechanism configured to impart a preselected ion-density distribution to the beam as irradiated at the selected location on the surface of the multilayer film.

16. (withdrawn) The device of claim 15, wherein the beam-adjustment mechanism comprises an electrostatic or electromagnetic lens element situated upstream of the multilayer-film mirror and configured to change a diameter of the beam as incident on the multilayer-film surface.

17. (withdrawn) The device of claim 12, wherein the ion source produces a focused ion beam as incident on the selected location on the surface of the multilayer film.

18. (withdrawn) The device of claim 12, further comprising a gas supply connected to the ion source, the gas supply being configured to deliver a flow of ionizable gas to the ion source such that the ion source produces a beam of ions of the gas and directs the beam toward the surface of the multilayer film.

19. (withdrawn) The device of claim 18, wherein the gas is selected from the group consisting of argon, xenon, and krypton.

20. (withdrawn) The device of claim 1, wherein the milling tool is a plasma-enhanced chemical-vapor-machining (CVM) tool.

21. (withdrawn) The device of claim 20, wherein the plasma-enhanced CVM tool comprises:

a plasma-generation source configured to generate a plasma and to cause the plasma to be situated adjacent the selected location on the surface of the multilayer film;

a movement mechanism configured to move at least one of the multilayer-film mirror and the plasma-generation source relative to each other; and

a controller connected to the plasma-generation source and the movement mechanism, the controller being configured to control actuation of at least one of the plasma-generation source and the movement mechanism.

22. (withdrawn) The device of claim 21, further comprising a gas supply situated and configured to deliver a stream of gas to the plasma adjacent the selected location, the gas being formulated to generate, in the plasma, free radicals that react with the surface of the multilayer film at the selected location.

23. (withdrawn) The device of claim 1, wherein the milling tool is a reactive-ion-etching (RIE) tool.

24. (withdrawn) The device of claim 1, wherein the milling tool is a localized-chemical-reaction tool.

25. (withdrawn) The device of claim 1, wherein the milling tool is a laser ablation tool.

26. (withdrawn) The device of claim 1, further comprising a position detector situated and configured to detect a position of the multilayer-film mirror.

27. (withdrawn) A method for milling a surface of a multilayer film on a multilayer-film reflective mirror so as to correct a phase shift in a reflected wavefront from the multilayer-film mirror, the multilayer film comprising multiple lamina sets formed at a specified period length on a mirror substrate, each lamina set consisting of alternating respective layers of at least two substances having different refractive indices to a wavelength of light to be reflected from the mirror, the method comprising the steps:

directing a layer-material-milling force at the selected location on the surface of the multilayer film so as to remove at least one layer from the selected location; and

while removing the at least one layer at the selected location, providing a desired distribution in the amount of material removed at the location.

28. (withdrawn) The method of claim 27, wherein the step of providing a desired distribution comprises providing a desired depth distribution.

29. (withdrawn) The method of claim 28, wherein the desired depth distribution is stepwise.

30. (withdrawn) The method of claim 28, wherein the desired depth distribution is smoothly contoured.

31. (withdrawn) The method of claim 27, wherein the step of providing a desired distribution comprises providing a desired lateral distribution.

32. (withdrawn) The method of claim 27, wherein the step of directing a layer-material-milling force comprises selecting at least one parameter of the layer-material-milling force according to the layer material being milled at the selected location on the surface of the multilayer film.

33. (withdrawn) The method of claim 27, further comprising the step of producing the layer-material-milling force.

34. (withdrawn) The method of claim 33, wherein the produced layer-material-milling force comprises lapping.

35. (withdrawn) The method of claim 33, wherein the produced layer-material-milling force comprises ion-beam milling.

36. (withdrawn) The method of claim 33, wherein the produced layer-material-milling force comprises plasma-enhanced chemical vapor machining.

37. (withdrawn) The method of claim 33, wherein the produced layer-material-milling force comprises reactive-ion etching.

38. (withdrawn) The method of claim 33, wherein the produced layer-material-milling force comprises localized chemical reaction.

39. (withdrawn) The method of claim 33, wherein the produced layer-material-milling force comprises laser ablation.

40. (withdrawn) The method of claim 27, wherein the step of directing a layer-material-milling force comprises selecting a respective layer-material-milling force according to the layer material being milled at the selected location on the surface of the multilayer film.

41. (withdrawn) The method of claim 27, wherein the step of directing a layer-material-milling force comprises disposing a mask member on or near the selected location on the surface of the multilayer film to limit the removal one or more layers at the selected location.

42. (withdrawn) The method of claim 41, wherein the step of disposing the mask member comprises applying a patterned resist to at least a portion of the surface of the multilayer film including the selected location.

43. (withdrawn) The method of claim 42, wherein the resist is applied and patterned by microlithography.

44. (withdrawn) The method of claim 43, further comprising the step of milling a portion of the multilayer film at the selected location using the resist pattern as a mask.

45. (withdrawn) The method of claim 44, further comprising the steps of:

removing the mask;

applying a new resist;

patterning the new resist; and

milling a portion of the multilayer film at the selected location using the newly patterned resist as a mask so as mill the selected location according to a desired profile.

46. (withdrawn) The method of claim 45, wherein the desired profile is a depth profile.

47. (withdrawn) The method of claim 46, wherein the depth profile is stepwise.

48. (withdrawn) The method of claim 46, wherein the depth profile is smoothly contoured.

49. (withdrawn) The method of claim 40, wherein the step of directing a layer-material-milling force comprises:

applying a resist to the surface of the multilayer film;

patterning the resist so as to define in the resist a thickness distribution of layers at the selected location on the surface of the multilayer film; and

milling the surface of the multilayer film at the selected location according to the resist pattern.

50. (withdrawn) The method of claim 49, wherein the resist is patterned microlithographically by directing an exposure light flux at the resist.

51. (withdrawn) The method of claim 50, wherein the resist is patterned by irradiation with the exposure light flux configured to have a desired light-intensity distribution corresponding to the thickness distribution.

52. (withdrawn) The method of claim 51, wherein the exposure light flux is configured by light interference to have the desired light-intensity distribution.

53. (currently amended) A multilayer-film mirror, comprising:

a mirror substrate; and

a multilayer film formed on a surface of the mirror substrate by alternatingly laminating multiple layers of at least two types of substances having different respective refractive indices, the layers being grouped into lamina sets having a specified period length, the multilayer film including a removed portion at a selected location at which at least one lamina set is removed to control phase shift in a reflected wavefront from the multilayer film, the removed portion having a predetermined ~~distribution~~ depthwise gradation with respect to amount of layer material removed.

54. (original) An X-ray optical system, comprising at least one multilayer-film mirror as recited in claim 53.

55. (original) An X-ray exposure apparatus, comprising an X-ray optical system as recited in claim 54.

56. (withdrawn) A multilayer-film mirror produced using the apparatus of claim 1.

57. (withdrawn) A multilayer-film mirror produced by the method of claim 27.

58. (original) An X-ray exposure apparatus, comprising:

an X-ray source that generates an X-ray beam;

an illumination-optical system that guides the X-ray beam from the X-ray source to a reticle that defines a pattern; and

a projection-optical system that guides the X-ray beam from the reticle to a lithographic substrate coated with a resist, so as to transfer the pattern from the reticle to the substrate, the exposure apparatus including at least one multilayer-film mirror as recited in claim 53.

59. (original) The X-ray exposure apparatus of claim 58, wherein the at least one multilayer-film mirror is situated in at least one of the illumination-optical system, the projection-optical system, and the reticle.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/241,959	09/11/2002	Tetsuya Oshino	4641-63481	8759

7590 07/14/2004

KLARQUIST SPARKMAN, LLP
One World Trade Center, Suite 1600
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Portland, OR 97204

EXAMINER	
YUN, JURIE	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/241,959	OSHINO ET AL.	
	Examiner	Art Unit	
	Jurie Yun	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2004*.

2a)☐ This action is FINAL. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *53-55,58 and 59* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *53-55,58 and 59* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/27/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. It is noted that in the last office action, the restriction requirement inadvertently stated that Group III included claims 53-59, but should have said claims 53-55 and 58-59, and an action on claims 53-55 and 58-59 follows. Applicant's election of Group III in the reply filed on 6/7/04 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). The restriction requirement is made final.

Specification

2. The abstract of the disclosure is objected to because it consists of more than 150 words. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 53-55, 58, and 59 are rejected under 35 U.S.C. 102(e) as being anticipated by Yan (USPN 6,641,959 B2).

5. With respect to claim 53, Yan discloses a multilayer-film mirror, comprising: a mirror substrate (Figs 1a-1g, 1100); and a multilayer film (1200 & 1400) formed on a surface of the mirror substrate by alternatingly laminating multiple layers of at least two types of substances having different respective refractive indices (1210 & 1220 and 1410 & 1420), the layers being grouped into lamina sets having a specified period length (column 2, lines 32+), the multilayer film including a removed portion at a selected location at which at least one lamina set is removed (see Fig. 1g) to control phase shift in a reflected wavefront from the multilayer film, the removed portion having a predetermined distribution with respect to amount of layer material removed.

6. With respect to claims 54 and 55, Yan discloses an X-ray exposure apparatus (Fig. 4, 4000 – "wafer exposure tool"), comprising an X-ray optical system as recited in claim 54. Yan discloses EUV, which is synonymous in the art with soft X-rays.

7. With respect to claims 58 and 59, Yan discloses an X-ray exposure apparatus comprising: an X-ray source (Fig. 4, 4010) that generates an X-ray beam (4012); an illumination-optical system (4020) that guides the X-ray beam from the X-ray source to a reticle (4030) that defines a pattern; and a projection-optical system (4040) that guides the X-ray beam from the reticle to a lithographic substrate coated with a resist (4050), so as to transfer the pattern from the reticle to the substrate, the exposure apparatus including at least one multilayer-film mirror as recited in claim 53, wherein the at least one multilayer-film mirror is situated in at least one of the illumination-optical system, the projection-optical system, and the reticle (4030).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Barbee, Jr. (USPN 4,915,463) discloses a multilayer diffraction grating. Iwamatsu et al. (USPN 5,514,499) disclose a phase shifting mask comprising a multilayer structure and method of forming a pattern using the same.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 571 272-2497. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jurie Yun
July 8, 2004

Craig E Church

Craig E. Church
Primary Examiner

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/241,959	09/11/2002	Tetsuya Oshino	4641-63481	8759

7590 12/05/2003

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EXAMINER	
YUN, JURIE	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 12/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/241,959	OSHINO ET AL.	
	Examiner	Art Unit	
	Jurie Yun	2882	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 November 2002*.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-59* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-59* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-26 and 56, drawn to a device for milling, classified in class 156, subclass 345.1+.

   II. Claims 27-52 and 57, drawn to a method of milling, classified in class 216, subclass 24.

   III. Claims 53-55, 58, and 59, drawn to a multilayer-film mirror, classified in class 378, subclass 34.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the method of milling could be done with a device other than the milling device claimed in Group I.

3. Inventions I and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are a milling device and a multilayer-film mirror. The multilayer-film mirror as claimed does not necessarily have to use the milling device being claimed.

4. Inventions II and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are a method of milling and a multilayer-film mirror. The multilayer-film mirror as claimed does not necessarily have to be produced by the milling method being claimed.

5. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, and the search for Group II is not required for Group III, and likewise for Groups I and III, restriction for examination purposes as indicated is proper.

6. A telephone call was made to Donald L. Stephens Jr. on 11/18/03 to request an oral election to the above restriction requirement, but did not result in an election being made.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

7. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 703 308-3535. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 703 308-4858. The fax phone number for the organization where this application or proceeding is assigned is 703 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0956.

Jurie Yun
November 19, 2003

Craig E. Church
Primary Examiner

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/241,959	09/11/2002	Tetsuya Oshino	4641-63481	8759

7590 05/17/2004

KLARQUIST SPARKMAN, LLP
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Portland, OR 97204

EXAMINER	
YUN, JURIE	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 05/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/241,959	OSHINO ET AL.	
	Examiner	Art Unit	
	Jurie Yun	2882	pw

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 09 January 2004.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-59 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) 1-59 are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This restriction supersedes the prior restriction of 12/5/03.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-26, drawn to a device for milling, classified in class 156, subclass 345.1+.

II. Claims 27-52, drawn to a method of milling, classified in class 216, subclass 24.

III. Claims 53-59, drawn to a multilayer-film mirror, classified in class 378, subclass 34.

The inventions are distinct, each from the other because of the following reasons:

3. Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used for milling a different product such as a product with one layer as opposed to multi-layers.

4. Inventions I, II, and III are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions are a milling device and a multilayer film mirror. The multilayer film mirror as claimed does not necessarily have to use the milling device

being claimed, and the multilayer film mirror as claimed does not necessarily have to be produced by the milling method being claimed.

5. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, and the search for Group II is not required for Group III, and likewise for Groups I and III, restriction for examination purposes as indicated is proper.

6. If applicant elects Group I or Group II from above, then there is also a species restriction.

FIRST SPECIES RESTRICTION

7. This application contains claims directed to the following patentably distinct species of the claimed invention:

Species A: lapping

Species B: ion-beam milling

Species C: chemical-vapor-machining

Species D: reactive ion etching

Species E: laser ablation

8. If applicant elects Group II, then there is also a second species restriction.

SECOND SPECIES RESTRICTION

9. This application contains claims directed to the following patentably distinct species of the claimed invention:

Species i: stepwise (claim 29)

Species ii: smoothly contoured (claim 30)

Species iii: lateral distribution (claim 31)

10. Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 1-5 and 26 are generic for Group I, and claims 27-33 and 40-52 are generic for Group II.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over

the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

NOTE: To be fully responsive, applicant must elect Group I, II, or III and if Group I or II is elected, applicant must also elect Species A, B, C, D, or E and optionally also Species i, ii, or iii.

11. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junie Yun whose telephone number is 571 272-2497. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jy.

Jurie Yun
May 3, 2004

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER